

In re WARKHEDE ET AL., Application No. 10/042,847
Amendment A

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method comprising:
generating a first representation of a hierarchical relationship among a plurality of first prefixes, which includes determining an ancestor tree based on the plurality of first prefixes;
determining an optimized representation of the hierarchical relationship among the plurality of first prefixes, which includes determining an optimized trie representation of the ancestor tree; and
generating a mapping of the plurality of first prefixes into a plurality of second prefixes based on the optimized representation.

Claim 2 (original): The method of claim 1, wherein the first representation includes a trie.

Claim 3 (original): The method of claim 2, wherein optimized representation includes a trie.

Claim 4 (original): The method of claim 1, further comprising causing an associative memory to be programmed with the plurality of second prefixes.

Claim 5 (original): The method of claim 4, wherein the associative memory includes a binary or ternary content-addressable memory.

Claim 6 (original): The method of claim 1, further comprising storing the plurality of second prefixes in a data structure.

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Claim 7 (original): The method of claim 1, further comprising maintaining a data structure indicating the mapping.

Claim 8 (original): The method of claim 1, wherein the plurality of first prefixes include a network address.

Claim 9 (canceled)

Claim 10 (currently amended): The method of ~~claim 9~~ claim 1, including adding a dummy node for each internal node of the first representation.

Claim 11 (original): The method of claim 1, wherein the plurality of second prefixes includes a match all prefix.

Claim 12 (original): The method of claim 1, wherein the plurality of second prefixes includes a dummy node for an internal node of the first representation.

Claim 13 (original): The method of claim 1, further comprising determining a set of mapped lookup values based on the optimized representation.

Claim 14 (original): The method of claim 13, further comprising causing the plurality of mapped lookup values to be stored in an associative memory.

Claim 15 (currently amended): A method of claim 1, further comprising:
receiving a set of information including a first value;
generating a lookup value from the set of mapped lookup values based on first value;
and
generating a lookup word based the lookup value. value;

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Claim 16 (original): The method of claim 15, further comprising:
causing an associative memory to be programmed with the plurality of second
prefixes; and
initiating a lookup operation on the associative memory using the lookup word.

Claim 17 (canceled)

Claim 18 (original): A method comprising:
determining a binary trie representation for a plurality of prefixes;
determining an ancestor tree based on the binary trie representation;
determining an optimized trie representation of the ancestor tree; and
determining a mapping of the plurality of the prefixes into a plurality of second
prefixes based on the optimized trie representation.

Claim 19 (original): The method of claim 18, further comprising extracting the
plurality of prefixes from a configuration table.

Claim 20 (original): The method of claim 18, wherein the configuration table contains
access control, quality of service, or routing information.

Claim 21 (original): The method of claim 18, further causing an associative memory to
be programmed with the plurality of second prefixes.

Claim 22 (original): The method of claim 21, wherein the associative memory is a
content-addressable memory.

Claim 23 (original): The method of claim 18, further comprising determining a set of
mapped lookup values based on the optimized representation.

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Claim 24 (original): The method of claim 23, further comprising causing the plurality of mapped lookup values to be stored in an associative memory.

Claim 25 (canceled)

Claim 26 (currently amended): An apparatus comprising:
a programming engine for determining a mapping between a plurality of first prefixes having a hierarchical relationship and a plurality of second prefixes having the hierarchical relationship;
a storage mechanism configured to maintain an indication of the mapping;
translation logic to determine a particular one of the plurality of second prefixes based on a particular one of the plurality of first prefixes; and
an associative memory to perform a lookup operation using the particular one of the plurality of second prefixes to generate a result;
wherein the programming engine includes an optimizer for determining an ancestor tree based on the plurality of first prefixes; wherein the programming engine references the ancestor tree when determining the mapping.

Claim 27 (original): The apparatus of claim 26, wherein the programming engine includes an associative memory programmer to program the associative memory.

Claim 28 (canceled)

Claim 29 (original): The apparatus of claim 26, wherein the plurality of first prefixes correspond to a plurality of network addresses.

Claim 30 (original): The apparatus of claim 26, wherein the plurality of prefixes are derived from an access control list.

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Claim 31 (original): The apparatus of claim 26, wherein the associative memory is a content-addressable memory.

Claim 32 (original): The apparatus of claim 26, wherein the programming engine is further configured to determine a set of lookup values based on the set of first prefixes.

Claim 33 (original): The apparatus of claim 32, further comprising a second associative memory for storing the set of lookup values.

Claim 34 (currently amended): An apparatus comprising:
means for generating a first representation of a hierarchical relationship among a plurality of first prefixes, which includes means for determining an ancestor tree based on the plurality of first prefixes;

means for determining an optimized representation of the hierarchical relationship among the plurality of first prefixes, which includes determining an optimized trie representation of the ancestor tree; and

means for generating a mapping of the plurality of first prefixes into a plurality of second prefixes based on the optimized representation.

Claim 35 (original): The apparatus of claim 34, wherein the first representation includes a trie.

Claim 36 (original): The apparatus of claim 34, wherein optimized representation includes a trie.

Claim 37 (original): The apparatus of claim 34, further comprising means for programming an associative memory with the plurality of second prefixes.

Claim 38 (original): The apparatus of claim 34, further comprising means for determining a set of mapped lookup values based on the optimized representation.

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Claim 39 (original): The apparatus of claim 38, further comprising means for generating a lookup value from the set of mapped lookup values based on a particular value.

Claim 40 (original): An apparatus comprising:
means for determining a binary trie representation for a plurality of prefixes;
means for determining an ancestor tree based on the binary trie representation;
means for determining an optimized trie representation of the ancestor tree; and
means for determining a mapping of the plurality of the prefixes into a plurality of second prefixes based on the optimized trie representation.

Claim 41 (original): The apparatus of claim 40, further comprising means for programming an associative memory with the plurality of second prefixes.

Claim 42 (new): One or more computer-readable media containing computer-executable instructions for performing operations, said operations comprising:
generating a first representation of a hierarchical relationship among a plurality of first prefixes, which includes determining an ancestor tree based on the plurality of first prefixes;
determining an optimized representation of the hierarchical relationship among the plurality of first prefixes, which includes determining an optimized trie representation of the ancestor tree; and
generating a mapping of the plurality of first prefixes into a plurality of second prefixes based on the optimized representation.

Claim 43 (new): The computer-readable media of claim 42, wherein said operations comprise causing an associative memory to be programmed with the plurality of second prefixes.

Claim 44 (new): The computer-readable media of claim 43, wherein said operations comprise storing the plurality of second prefixes in a data structure.

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Claim 45 (new): The computer-readable media of claim 42, wherein said operations include adding a dummy node for each internal node of the first representation.

Claim 46 (new): The computer-readable media of claim 42, wherein the plurality of second prefixes includes a dummy node for an internal node of the first representation.

Claim 47 (new): The computer-readable media of claim 42, wherein said operations comprise determining a set of mapped lookup values based on the optimized representation.

Claim 48 (new): The computer-readable media of claim 47, wherein said operations comprise causing the plurality of mapped lookup values to be stored in an associative memory.

Claim 49 (new): The computer-readable media of claim 42, wherein said operations comprise:

- receiving a set of information including a first value;
- generating a lookup value from the set of mapped lookup values based on first value;
- and
- generating a lookup word based the lookup value.

Claim 50 (new): The computer-readable media of claim 49, wherein said operations comprise:

- causing an associative memory to be programmed with the plurality of second prefixes; and
- initiating a lookup operation on the associative memory using the lookup word.

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Claim 51 (new): One or more computer-readable media containing computer-executable instructions for performing operations, said operations comprising:

- determining a binary trie representation for a plurality of prefixes;
- determining an ancestor tree based on the binary trie representation;
- determining an optimized trie representation of the ancestor tree; and
- determining a mapping of the plurality of the prefixes into a plurality of second prefixes based on the optimized trie representation.

Claim 52 (new): The computer-readable media of claim 51, wherein said operations comprise extracting the plurality of prefixes from a configuration table.

Claim 53 (new): The computer-readable media of claim 51, wherein the configuration table contains access control, quality of service, or routing information.

Claim 54 (new): The computer-readable media of claim 51, wherein said operations comprise causing an associative memory to be programmed with the plurality of second prefixes.

Claim 55 (new): The computer-readable media of claim 54, wherein the associative memory is a content-addressable memory.

Claim 56 (new): The computer-readable media of claim 51, wherein said operations comprise determining a set of mapped lookup values based on the optimized representation.

Claim 57 (new): The method of claim 56, wherein said operations comprise causing the plurality of mapped lookup values to be stored in an associative memory.